Space Weather Forecast

Issued on Saturday, 22 January 2022 at 12:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight daily chance of G1/Minor Geomagnetic Storms from Coronal Mass Ejections (CMEs) throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Very Low in the past 24 hours, with no significant X-ray flares recorded. There are now just two sunspots on the visible disc, both small and simple groups. One of the regions which has recently rotated over the northwest limb is still showing some activity however. No Earth-directed CMEs have been observed in available imagery in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind showed the arrival of a weak CME, the effects of which are now waning. Wind speed was at slightly elevated levels, just above 400km/s, with a weak enhancement around 21/1310UTC to near 500 km/s at times. Wind speeds are now just above 400 km/s. The Total Interplanetary Magnetic Field has been weak, but showed a kick with the weak CME arrival. The north-south component was also weak but has been predominantly southward directed. Geomagnetic activity has been Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed this period. However, the high energy particle flux was just slightly elevated, and continued to slowly decline from the recent S1/Minor solar radiation storm event.

Four-Day Space Weather Forecast Summary
Solar Activity: There is initially a very slight but diminishing chance of isolated Moderate-class flares, however this risk soon eases as the more active region over the western limb rotates further away. Very Low solar activity is then expected, with a slight chance of Common-class flares.

Solar Wind / Geomagnetic Activity: There are possible CME influences on the first three days of the forecast period. Weak CME effects are currently waning. A further CME from 19th Jan is possible on the 23rd. On the 24th two CMEs, one from the 20th and another from 21st Jan, could also possibly glance past Earth. In the absence of the CMEs above, solar winds are expected to initially be background to slightly elevated, with an increasing chance of a coronal hole fast wind developing from the second half of 23 Jan onwards.
The resultant forecast is very low confidence in timing and phasing of G1/Minor storm risk, but higher for this being the maximum attained geomagnetic activity. In the absence of any CMEs, Quiet to Unsettled activity should give way to more frequent Unsettled periods, with a chance of isolated Active intervals, from later Day 2 (23rd) associated with coronal hole influence.

Energetic Particles / Solar Radiation: The risk of solar radiation storms is now considered only a very slight chance, and the risk is forecast to slowly decrease to Background levels in the first half of the forecast period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	20	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	5	2	1	1
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	2	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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